CHAPTER 28: Flammable and Combustible Liquids

This chapter will review and provide references to the ***MIOSHA General Industry Safety Standard – Part 75, Flammable and Combustible Liquids***. The design and construction of inside storage rooms and the safe handling requirements to assure employee safety for all establishments are addressed. The standard also makes reference to various tables that can assist you in understanding these provisions. This helps you with allowable quantities and maximum size specifications. Refer also to Chapter 7 covering spills and emergency response planning to ensure all appropriate safety precautions are being undertaken at your facility.

The hazards associated with the handling of either flammable or combustible liquids MUST be addressed in your Hazard Communication Program (also refer to Chapter 9). You should refer to your Material Safety Data Sheets (MSDS) for assistance in this area. The following are some common terms and definitions that you should be aware of:

- *"Flash point"* - The minimum temperature at which a substance produces enough vapor to promote combustion (be ignited). Generally, the lower the flash point, the greater the danger of explosion.

- *"Flammable liquid"* - Any liquid having a flash point below 100 degrees Fahrenheit (F). Flammable liquids are divided into three classes as follows:

  Class IA - liquids having flashpoints below 73 degrees F and having a boiling point below 100 degrees F
  Class IB - liquids having flashpoints below 73 degrees F and having a boiling point at or above 100 degrees F
  Class IC - liquids having flashpoints at or above 73 degrees F and below 100 degrees F

- *"Combustible liquid"* - Any liquid having a flash point at or above 100 degrees Fahrenheit. Combustible liquids are divided into two classes as follows:

  Class II - liquids having flashpoints at or above 100 degrees F and below 140 degrees F
  Class III - liquids having flashpoints at or above 140 degrees F

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28.1 Safe Practices

Safe practices on the part of employees who handle flammable and combustible liquids are essential in the prevention of fire and explosion

hazards. Regardless of the quantities involved, each flammable liquid to be used should be analyzed to determine the extent of its flammability and any health hazards associated with the liquid so that appropriate control measures can be taken.

Flammable and combustible liquids are categorized by their ease of ignition. Flammable liquids are more easily ignited than combustible ones. Examples of flammables are:

- Acetone;
- Gasoline; and
- Lacquer thinner.

Examples of combustibles are:

- Kerosene;
- Fuel oil; and
- Stoddard solvent.

Connections on all drums and piped systems of flammable and combustible liquids must be vapor- and liquid-tight.

When flammable liquids are transferred from one container to another, e.g., from a bulk container to another, they must be effectively bonded and grounded. This practice prevents electrical discharge (sparks) from the accumulation of static charge because of the transfer process.

All spills of flammable or combustible liquids must be cleaned up promptly. With major spills, remove any ignition sources, ventilate the area, and provide respirators if needed. These liquids must not be allowed to enter a confined space such as a pit or sewer, because of the possibility of an explosion.

Supplies of flammable and combustible liquids must be stored in approved fire resistant safety containers equipped with flash screens and self closing lids. All flammable liquids must be kept in closed containers when not in use.

Employers should require that all combustible waste material (e.g., rags and shop towels that have been used for cleaning) and residues in plant or storage areas be kept to a minimum, stored in covered metal receptacles, and disposed of daily.

28.2 Design, Construction, and Capacity of Storage Cabinets

The quantity of liquid that may be located outside of an inside storage room or storage cabinet in a building or in any one fire area of a building shall not exceed:

- 25 gallons of Class IA liquids in containers;
- 120 gallons of Class IB, IC, II, or III liquids in containers; or
- 660 gallons of Class IB, IC, II, or III liquids in a single portable tank.

Flammable & Combustible Liquids Commonly Found in the Printing Industry

CHEMICAL	FP °F	CLASS	CATEGORY
Acetone	0	IB	Flammable
Ethyl Acetate	24	IB	Flammable
Exx-Print®	225+	IIIB	Combustible
Isopropyl alcohol	53	IB	Flammable
MEK (methyl ethyl ketone)	22	IB	Flammable
n-Propyl Acetate	55	IB	Flammable
Stoddard Solvent (blanket/ wash)	110	II	Combustible
Toluene	40	IB	Flammable
Mineral Oil	275+	III	Combustible

Storage cabinets must meet National Fire Protection Association test requirements and must be properly labeled "FLAMMABLE – KEEP FIRE AWAY."

Open flames and smoking must not be permitted in flammable or combustible liquid storage areas.

Contact the Michigan Department of Consumer and Industry Services, Consultation, Education and Training Division at 517-322-1809 for the poster *"Danger – No Smoking, Matches or Open Flames" (CET #0321)*.

28.3 Design and Construction of Inside Storage Rooms

Inside storage rooms shall be constructed to meet the required fire-restrictive rating for their use. Such construction shall comply with the test specifications set forth in *"Standard Methods of Fire Tests of Building Construction and Materials*," *NFPA 251-1969*.

- Openings to other rooms or buildings must have noncombustible, liquid-tight, raised sills or ramps at least four inches in height, or the floor in the storage area must be at least four inches below the surrounding floor. A permissible alternate to the sill or ramp is an open-grated trench inside the room that drains to a safe location. This method may be preferred if there is an extensive need to transfer flammable liquids into and out of the room by means of hand trucks;

- Any openings must have approved, self-closing fire doors;

- The room must be liquid-tight where the walls join the floor;

- An aisle at least three feet wide must be maintained in every inside storage room;

- Easy movement within the room is necessary in order to reduce the potential for spilling or damaging the containers, and to provide both access for fire fighting and a ready escape path for occupants of the room should a emergency occur;

- Containers over 30 gallons in capacity cannot be stacked one upon the other; and

- Dispensing of flammables and combustibles must be by approved pump or self-closing faucet only.

28.4 Housekeeping

Maintenance and operating practices of your printing facility must be in accordance with established procedures that tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills must be cleaned up promptly!

Adequate aisles must be maintained for unobstructed movement of personnel and so fire protection equipment can be brought in to any part of the flammable or combustible liquid storage area.

All combustible waste material and residues in your building(s) must be kept to a minimum, stored in covered metal receptacles, and disposed of daily.

Smoking is not allowed outside of designated areas and signage should be posted in all flammable and combustible storage areas.